

Brosseau Road Bridge  
County Road 694 Spanning Cloquet River  
Burnett Vicinity  
St. Louis County  
Minnesota

HAER No. MN-58

HAER  
MINN  
69-BURN.V  
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Rocky Mountain Regional Office  
Department of the Interior  
P.O. Box 25287  
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

BROSSEAU ROAD BRIDGE

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Location: Spanning Cloquet River at Brosseau Road (County Road 694),  
Burnett Vicinity, St. Louis County, Minnesota

UTM: 15:536945:5193540

Quad: Alborn, Minnesota (7.5 minute series)

Date of Construction: 1911

Present Owner: St. Louis County

Present Use: Vehicular highway bridge

Significance: Designed by Edward Kirk Coe, staff highway engineer for St.  
Louis County, the Brosseau Road Bridge was constructed in 1911  
by the Penn Bridge Company of Beaver Falls, Pennsylvania. In  
addition to being the oldest extant Parker overhead truss in  
Minnesota, the structure is an important early example for the state  
of county sponsorship of professional bridge engineering.

Historians: Deanne L. Zibell and Jeffrey A. Hess

The Brosseau Road Bridge carries an unpaved north-south highway (County Road 694) over the Cloquet River in Section 17 of Industrial Township in rural St. Louis County, about one mile southeast of the community of Burnett and twenty miles northwest of the City of Duluth (see Figure 1). The bridge's erection in 1911 was part of the general construction of the newly authorized Brosseau Road, which parallels the Duluth, Missabe, and Iron Range Railway (DMIRR) for several miles on either side of the river. The DMIRR bridge over the Cloquet -- a Warren deck-truss structure -- stands just upstream from the Brosseau Road Bridge. For its main span, the Brosseau Road Bridge incorporates a 170.5-foot Parker overhead truss, which is the oldest, extant, Parker highway span in Minnesota. Two Pratt pony approach spans, one on each end, were moved to the site in 1920 when the bridge was remodeled.<sup>1</sup>

Settlement in the woodlands northwest of Duluth was sparse before the DMIRR (originally known as the Duluth, Missabe and Northern Railway) laid tracks to the mines of the Iron Range in the early 1890s.<sup>2</sup> The railroad's immediate impact was clearly illustrated by Industrial Township, which was summoned into existence by the new depots of Saginaw, Grand Lake, and Burnett. When officially organized in 1891, the township boasted about 60 residents; by the turn of the century, its population approached 160 and exceeded 360 in 1910. Although the township's depots were equipped with loading platforms and cattle chutes, they never became

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<sup>1</sup> The bridge's status as the state's oldest Parker highway span is based on an computerized list of surviving, steel overhead trusses prepared by the Minnesota Department of Transportation at the request of the authors. This list assigns the Brosseau Road Bridge (identified as Bridge No. 7797) a construction date of 1920, which is actually the date of the structure's remodeling. The next oldest Parker truss is a 130-foot riveted structure in Jackson County, built in 1913.

<sup>2</sup> Frank A. King, The Missabe Road: The Duluth, Missabe, and Iron Range Railway (San Marino, CA: Golden West Books, 1972), 46-47.

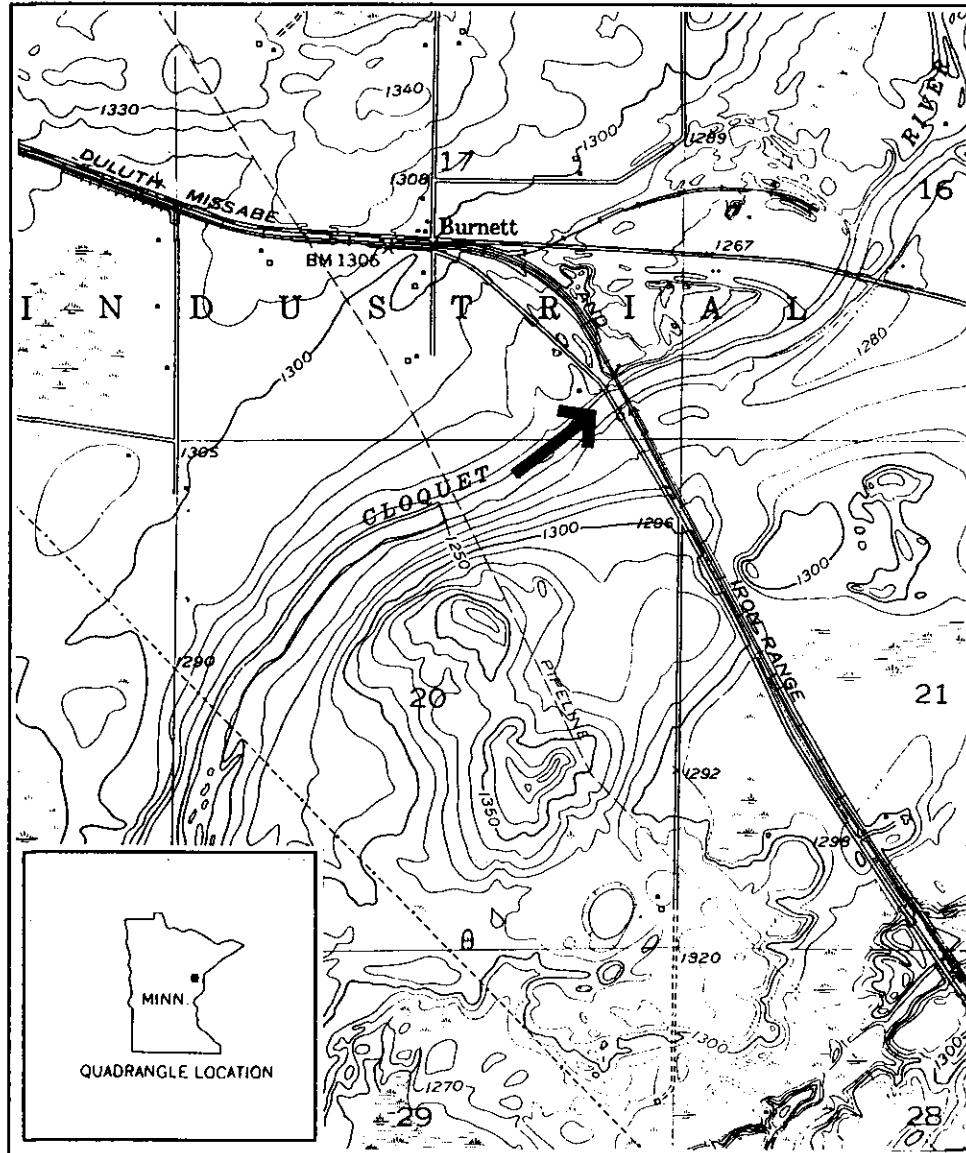


Figure 1: Map of the Brosseau Road Bridge and vicinity. (Source: USGS, "Alborn, Minn.," 7.5 Minute Series, 1953; photorevised 1969; photoinspected 1972.)

major agricultural shipping centers. The area's swampy, thin soil, and short growing season restricted farming to a subsistence level.<sup>3</sup>

The township's main cash crop was timber, first white pine, then the less valuable species used for pulpwood, railroad ties, and mining timbers -- spruce, poplar, balsam, cedar, and tamarack. By the 1920s, most of the area's merchantable timber had been harvested, the last log drive on the Cloquet River occurring in 1924. Reflecting the decline in economic opportunities, the population of Industrial Township dropped from 789 in 1920 to 335 in 1930. Even at their most prosperous, however, the depot towns were little more than woodland clearings along the track. In Burnett, for example, the only major commercial buildings were a general store, built by the turn of the century, and a few structures associated with the railroad's extensive gravel operations.<sup>4</sup>

For early settlers in the Burnett area, the swift Cloquet River was a serious obstacle to transportation, "unless it was winter, when people crossed with loads on the ice, or in summer when water was low."<sup>5</sup> The nearest highway bridge, constructed in 1892 and rebuilt in 1902, was located about ten miles to the northeast on the Swan Lake Road (now U.S. Trunk Highway

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<sup>3</sup> For township formation, see Jacqueline Moran, Recollections, An Informal History of the Albion Area, St. Louis County, Minnesota (Duluth, MN: St. Louis County Historical Society, 1980), 2-3, 17-18, 24-25; Walter Van Brunt, Duluth and St. Louis County Minnesota: Their Story and People, (Chicago: The American Historical Society, 1921), vol. 2, 693-694.

<sup>4</sup> Moran, 17-24; Van Brunt, 694; J. C. Ryan, "Last Log Drive on the Cloquet," Timber Producers Bulletin (April-May 1982): 19; St. Louis County Historical Society, "Retrace by Rail. . . the Iron Trail," September 1962, in Northeast Minnesota Historical Center, University of Minnesota-Duluth, Duluth.

<sup>5</sup> Albion Region Pioneers, "Souvenir Number Albion-New Independence-Industrial Township Region," TMs, 29 September, 1940, n.p.

No. 53), the main route into Duluth.<sup>6</sup> After enduring such inconvenience for twenty years, the residents of Independence Township petitioned the St. Louis County Commissioners in 1910 to build a new highway across the Cloquet River, linking Burnett to the communities of Saginaw and Grand Lake to the southeast. The petition was formally presented by F. Brosseau, whose family in 1890 had staked the first homestead claim in Section 17 of Industrial Township. In acceding to the request, the county board named the new thoroughfare "Brosseau Road."<sup>7</sup>

The St. Louis County Commissioners approached the construction of the Brosseau Road Bridge quite differently than their predecessors had dealt with the first highway bridge over the Cloquet River two decades before. At that time, the board had selected, on the basis of competitive bids, S. M. Hewitt and Co. of Minneapolis to build a bridge according to the company's own plans and specifications.<sup>8</sup> Although most county bridge contracts were awarded in this manner in Minnesota and surrounding states, the contract-letting process drew sharp criticism from advocates of the "Good Roads Movement," who contended that competitive bidding alone was not sufficient to safeguard the public interest. The public also required unbiased engineering expertise, which was woefully lacking on most county boards. As one highway reformer explained:

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<sup>6</sup> On the construction and rebuilding of the bridge, see St. Louis County Commissioners Record, 10 November 1890, in Northeast Minnesota Historical Society, University of Minnesota-Duluth; Moran, 2. Hereafter, the county commissioners' proceedings will be cited as "Record," with appropriate dates. For the location of Swan Lake Road, see New Sectional Map of St. Louis County, Minnesota (St Paul: Jewett and Son, c. 1898).

<sup>7</sup> U. S. General Land Office, Original Entry Tract Books, vol. 7 (Microfilm 46, Roll 3, 234), in State Archives, Minnesota Historical Society, St. Paul; Record, 8 April, 7 June, 1910.

<sup>8</sup> Record, 10 November 1890.

Since there is no uniformity in the plans [submitted to the county board,] there is no real basis for comparison of the bids. . . . The officials, having at best very little knowledge regarding the plans, then usually go into a room by themselves and call in the contractors' agents one by one to have them "explain" their plans. [Each] tries to convince them that his particular plan is the happy combination of price with value. . . . The result of these "explanations" is generally to confuse rather than to explain and to leave the officers less able to render good judgment than before hearing them.<sup>9</sup>

At times, the confusion of county officials was not so innocent. According to George H. Herrold, one of the first city planners in Minnesota, the traditional method of county bridge construction easily lent itself to favoritism and graft:

The writer recently attended a bridge letting in an adjoining state. . . . Plans and proposals for 10 reinforced concrete bridges, with alternate plans for steel at four of the sites were advertised for by the county commissioners. . . . Bidders were requested to visit the site of each bridge and submit a plan and a lump sum bid for the structure. On the appointed day, 15 bidders appeared at the county seat and submitted their plans and proposals. They were then informed that the bids would be opened next day. I do not wish to impugn for a moment the motive of these honest commissioners, but the visitors had the privilege of buying "cats, smokes and liquid refreshments" during the evening. The next morning the bids were opened, approximately 125 plans were submitted to those five honest farmers, who, assisted by the county surveyor, proceeded to analyze the plans and tabulate the bids. They finally decided to let the concrete bridges to a local cement street paver, and the steel bridges to a relative of one of the county officers. The commissioners evidently decided that, as they knew nothing about the relative value of the plans, they would take a chance on men whom they knew, regardless of other considerations. The lowest bidder was informed that they did not like his plans.<sup>10</sup>

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<sup>9</sup>Hans Nelson Brue, "The Development of Highway Bridges in Wisconsin," unpublished civil engineering thesis, University of Wisconsin, 1916, 6, in State Historical Society of Wisconsin Library, Madison, Wisconsin. Although Brue is criticizing Wisconsin practices, the system was the same in Minnesota.

<sup>10</sup> George H. Herrold, "Reinforced Concrete Highway Bridges," Tenth Bulletin of the Minnesota Surveyors' and Engineers' Society (1912-1913): 87-88.

In 1905, the Minnesota State Legislature took the first step toward placing highway bridge construction under state supervision. In that year, it created the Minnesota Highway Commission (MHC) to advise local governments concerning highway construction and to approve the design of projects constructed with state funds. The MHC was particularly interested in changing "the peculiar method of contracting for bridges without the advice or assistance of a bridge engineer well posted in such matters, and allowing such bridges to be built without any supervision."<sup>11</sup>

Unfortunately, the MHC was underfunded and overworked. As a practical matter, the agency was forced to concentrate on state-funded projects, leaving a good deal of county bridge construction without expert public supervision. For example, three years after the MHC's formation, the commissioners of Meeker County in south-central Minnesota were still letting bridge contracts in the traditional manner and suffering the traditional confusion. In a petition to the MHC, the Meeker County Board described its problems and suggested a remedy:

. . . In the construction of steel bridges across the different streams that intersect our highways, the County Board is often at a great loss in deciding on the relative merits of the many different plans of bridges with their accompanying detailed specifications as submitted by the numerous bidders who appear and offer each a different plan from which only a competent bridge engineer, after a thoro [sic] examination could select the best for the money asked . . . . It is the opinion of this Board that the proper solution of the question would be for the state to adopt

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<sup>11</sup> The quotation is from Second Annual Report of the State Highway Commission of Minnesota, 1908 (Minneapolis: Pedersen Linotyping Co. Print, n.d.), 62. For a discussion of the early duties and activities of the Commission, see Robert M. Frame III, "Historic Bridge Project: A Report," 22-23, in Jeffrey A. Hess, "Final Report of the Minnesota Historic Bridge Survey: Part 1," prepared by Jeffrey A. Hess, Historical Consultants for Minnesota Historical Society and Minnesota Department of Transportation, August 1988.

a set of standard plans and specifications for all bridges . . . to be furnished free on request to the several counties.<sup>12</sup>

Although the MHC prepared a few standardized plans in 1908, these initial designs were limited to culverts and bridge floors. It was not until 1912-1913 that the agency was able to produce a more comprehensive collection that included standardized designs for long-span structures. During the interim, most county boards continued to rely on the design proposals of bridge companies. A few counties, however, reformed their contract-letting process by hiring professional engineers, as either consultants or staff, to prepare plans prior to bidding. St. Louis County was among this group.<sup>13</sup>

In 1909, the St. Louis County Board hired Edward Kirk Coe as county engineer. Trained as a civil engineer at Cornell College in Lakeland, Illinois, Coe had worked on railroad and harbor improvements in the Duluth area since 1891.<sup>14</sup> Although county records are not completely clear on the matter, Coe's appointment seems to have coincided with a change in the county's bridge procurement procedures. By early 1910, the official county board minutes indicate that bridge companies were no longer submitting their own designs, but instead were

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<sup>12</sup> Resolution of the Meeker County Board, 13 March 1908, in Meeker County Folder, 1906-1912, Minnesota Highway Department Collection, Minnesota State Archives, Minnesota Historical Society, St. Paul.

<sup>13</sup> In 1910, for example, the commissioners of Fillmore County in southeastern Minnesota commissioned the Minneapolis Steel and Machinery Company, which had an excellent reputation for bridge design, "to prepare drawings, plans, and specifications for a uniform system of bridges" to be used for preparing bid documents; Fillmore County Commissioners' Minutes, 25 May 1910, in Fillmore County Courthouse, Preston, Minnesota. For the MHC's early efforts at producing standardized bridge plans, see Second Annual Report, 1908, 5; Report of the State Highway Commission of Minnesota for 1909-1910-1911 (n.p, n.d.), 11, 33, 39-40; Minnesota State Highway Commission, Standard Specifications for Steel and Concrete Highway Bridges, Bulletin No. 9 (Minneapolis: The Thos. Clark Co., 1912).

<sup>14</sup> John William Leonard, Who's Who in Engineering, 1925 (New York: Who's Who Publications, Inc, 1925), 414.

bidding on plans supplied by the county.<sup>15</sup> The new procedure was clearly stipulated for the Brosseau Road Bridge, which went out to bid in January 1911. According to the commissioners' minutes, the county at that time advertised for a "steel bridge across the Cloquet River on the Brosseau Road . . . according to plans and specifications to be prepared by the Engineer of Roads."<sup>16</sup>

Drawings prepared at the end of January 1911 show that Coe's original plan for the Brosseau Road Bridge called for an 170.5-foot, 11-panel, pin-connected Parker overhead truss on concrete piers, approached by multiple wood-stringer spans on each end.<sup>17</sup> Patented by Bostonian Charles H. Parker in 1870, the Parker truss modified the standard Pratt truss by adding a curved or polygonal top chord and an inclined endpost, thereby creating a safer, longer, and cheaper metal truss span. For several decades after 1890, the pin-connected Parker truss, with various modifications, was the preferred design among American engineers for long-span highway and railroad bridges.<sup>18</sup> For example, when the MHC prepared its comprehensive set of standardized plans in 1912-1913, it mandated the pin-connected Parker truss for spans over

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<sup>15</sup> In February 1910, the county board (apparently for the first time) supplied bidders with plans for a St. Louis River bridge so that their proposals could be evaluated in terms of the same design criteria; see Record, 8 February 1910.

<sup>16</sup> Record, 21 January 1911.

<sup>17</sup> See the following drawings at the St. Louis County Highway Department in Virginia, Minnesota: "[Elevation and Details of] Cloquet River Bridge on Brosseau Road," 21 January 1911; "Profile [of] Cloquet River Bridge," 24 January 1911.

<sup>18</sup> Dennis M. Zembala, Elm Street Bridge (Woodstock, VT: Woodstock National Historic District Commission, 1977), 6-10; T. Allan Comp and Donald Jackson, Bridge Truss Types: A Guide to Dating and Identifying, Technical Leaflet 95 (Nashville, TN: American Association for State and Local History, 1977), n.p.; Mansfield Merriam and Henry S. Jacoby, A Text-Book on Roofs and Bridges, Part I, Stresses in Simple Trusses (New York: John Wiley and Sons, 1909), 212, 238.

140 feet.<sup>19</sup> Coe's detailing of the Brosseau Road Bridge also conformed to standard American engineering practice. As was customary for Parker highway spans of this period, Coe specified paired channels with cover plate for the top chord; paired channels with batten plates for the lower chord; paired channels with lacing for the vertical members; paired punched eyebars for the diagonal members; single square rods with turnbuckles for the counters; and single or paired angle sections for the portal, overhead, and bottom-lateral bracing.<sup>20</sup>

In early February 1911, ten bridge companies submitted bids for constructing Coe's design for the Brosseau Road Bridge, but the St. Louis County Board rejected all of them, presumably because of price. The board opened new bids in early April, and this time it awarded a contract for \$5,779 to the Penn Bridge Company, which had reduced its offer of the previous month by twenty percent.<sup>21</sup>

The successful bidder was an old line bridge-building firm, originally established in 1868 in New Brighton, Pennsylvania as T. B. White and Sons, and officially reorganized in 1887 in Beaver Falls, Pennsylvania as Penn Bridge Company. According to an 1888 history, the company fabricated and erected all types of architectural metalwork, as well as structural iron and steel for bridges, roof trusses, and buildings. By the early 1900s, it was shipping its wares "as far west as Nebraska and even into Central America." Although Penn Bridge Company had

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<sup>19</sup> MHC, Standard Specifications, 6.

<sup>20</sup> The evaluation that the Brosseau Road Bridge was a standard piece of engineering is based on the experience of one of the authors (Jeffrey A. Hess) with statewide surveys of historic highway bridges in Minnesota, North Dakota, South Dakota, Wisconsin, and Nebraska. For a pictorial explanation of bridge-structure terminology, see Comp and Jackson, Bridge Truss Types, Diagram 6, n.p.

<sup>21</sup> Record, 1 February, 7 April, 1911.

attempted to market bridges in Minnesota as early as 1889, it seems to have achieved relatively little success. The Brosseau Road Bridge is the only known example of the company's work in the state.<sup>22</sup>

Penn Bridge Company completed the Brosseau Road Bridge on schedule in the fall of 1911.<sup>23</sup> The structure remained unchanged until 1920, when the St. Louis County Board contracted with the Minneapolis Bridge Company to strengthen the original design by replacing the timber stringers in the main span with I-beam and channel sections and by reconstructing completely the wooden approach spans with two steel, rigid-connected, Pratt pony trusses relocated from separate crossings of Hellwig Creek in New Independence Township immediately to the north. To accommodate the new approach spans, the contractor erected reinforced-concrete "buried abutments" on each shore and enlarged each of the existing concrete river piers with a concrete pillar. Work on the remodeling began in late April 1920 and concluded by mid-

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<sup>22</sup> For information on the Penn Bridge Company, see Iron Highway Bridges as built by the Penn Bridge Company, Beaver Falls, PA (n.p., 1886); History of Beaver County, Pennsylvania (Philadelphia: A. Warner & Company, 1888), 432, 820-821; Joseph H. Bauman, History of Beaver County Pennsylvania and Its Centennial Celebration, (New York: Knickerbocker Press, 1904), vol. 2, 675, 1269; Robert M. Frame III, "Historic Bridge Report," prepared for the State Historic Preservation Office of the Minnesota Historical Society, and the Minnesota Department of Transportation, 31 March 1985, 92. For other Penn Bridge Company bridges, see Donald C. Jackson, Great American Bridges and Dams (Washington D.C.: The Preservation Press, 1988), 119; Commonwealth of Pennsylvania, Pennsylvania Historical and Museum Commission, and Pennsylvania Department of Transportation, Historic Highway Bridges in Pennsylvania (Commonwealth of Pennsylvania, 1986), 132-133, 143; Dwight A. Smith, James B. Norman, and Pieter T. Dykman, Historic Highway Bridges of Oregon (Portland: Oregon Historical Society Press, 1989), 247; Kentucky Department of Transportation, Bureau of Highways, Division of Environmental Analysis, A Survey of Truss, Suspension, and Arch Bridges in Kentucky (Kentucky Department of Transportation, 1982), Form #10.

<sup>23</sup> Record, 7 November 1911.

June.<sup>24</sup> Since 1920, the bridge has experienced only minor alterations, such as the renewal of the wood decking, the installation of metal Armco railings on the roadway side of the truss webs, and the addition of I-beam stringers to the approach spans.

In 1991, St. Louis County investigated the options of replacing or rehabilitating the Brosseau Road Bridge in order to bring the crossing into conformance with state and federal highway regulations concerning load-bearing capacity, roadway width, and vertical clearance. Based on this study, county and state authorities concluded that "it does not appear that there is a prudent and feasible alternative to demolition of the bridge." Since the Brosseau Road Bridge had previously been determined to be an historically significant structure, St. Louis County agreed that, prior to demolition, it would document the bridge according to standards established by the Historic American Engineering Record of the National Park Service.<sup>25</sup> This study is intended to fulfill that obligation.

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<sup>24</sup> The remodeling work is summarized in Record, 19 March 1920. See also drawings, contract documents and contractor reports dealing with the project in Maintenance File, St. Louis County Highway Department Office, Virginia, MN.

<sup>25</sup> See the following correspondence in File 91-261-02, State Historic Preservation Office (SHPO), Minnesota Historical Society: Dennis A. Gimmestad, Deputy State Historic Preservation Officer to Tom Tri, St. Louis County Highway Department, 15 April 1991; Gimmestad to Steven J. Kniefel, St. Louis County Highway Department, 6 June 1991; Gregory D. Kendrick, Rocky Mountain Regional Office, National Park Service to Kniefel, 6 February 1992.

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